



SPRING
2000

Challenge NEWSLETTER

Chicago determined to “smash the ULEV barrier”

The winner of last year’s Ethanol Vehicle Challenge, the Mechanical Engineering team from the University of Illinois at Chicago (UIC), is hoping

to repeat again in 2000 with the added intention of “smashing the ULEV barrier.”

Highly-placed throughout the entire competition, 1st Place UIC also won Best Fuel Economy and Best Flame Arrestor Design in 1999 and came 3rd Overall in the Malibus in ‘98 and won best Cold Start.

Lights, camera, action

On May 16, Natural Resources Canada Minister Ralph Goodale will address a 300-person gala banquet of the 3rd Ethanol Vehicle Challenge on Parliament Hill in Ottawa.

The next day, he joins Environment Canada Minister, David Anderson, and GM of Canada President Maureen Kempston Darkes back on the Hill for the send-off of 16 Chevrolet Silverados to Canadian headquarters in Oshawa, Ont. and the oral presentation, appearance and design judging there May 18.

On May 19th, a mid-morning press conference is scheduled for Ontario’s provincial capital buildings in Toronto.

(See reverse)

Wayne State in hunt for second Challenge win

First Overall in 1998, with the fastest accelerating and most on-road, fuel efficient Malibu, Wayne State University placed 1st on emissions but 5th Overall in the ‘99 Silverado competition — a drop the Detroit team hopes to rebound from this time around.

With Mechanical Engineering Faculty Advisor, Dr. Dina Taraza, the 14-member team led by engineering student, Jarret Zablocki, will look to cold start and fuel economy improvements on the 5.3 liter truck engine to headline the game plan.

“We plan on redesigning our pistons to improve fuel consumption, acceleration, and emissions,” states team spokesman, Greg Maciasz. “Our electrical controls



Chicago squad after another batch of awards.

Accompanying Chicago’s ultra-low emissions ambitions, the 17-member team with 60% new membership will also focus on cold start and driveability.

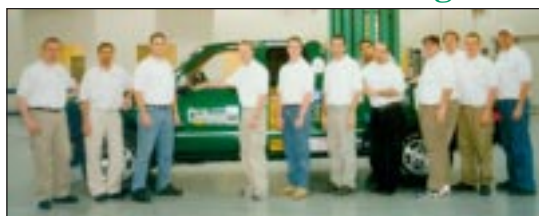
“The idea of using the same vehicle two years in a row is a win-win situation,” says team member, Mirko Barbir. “We’ve had the time to learn how the truck works inside and out. This makes the implementation of new technologies easier to deal with.”

Such a “real world problem”, as the event presents, is “truly a challenge,” he remarks. “We must apply everything we’ve learned thus far in order to solve the problem or optimize a certain aspect of it.”

One aspect, public relations, keeps UIC quite busy, most recently in mid-Feb in front of 1 million visitors at the 92nd Annual Chicago Auto Show.

Pictured are top row team members: (L) Bill Kazlauskas, Giuseppe Nardulli, Sarah Taubitz, Andrew Locke, Mirko Barbir, Pete Probst, Patrick Barasa (Team Leader), Sean Murphy, Dan Schmidt, John Zientek, Brianno Collier (Faculty Advisor), Brian Gorman.

Middle row: (L) Mike Groen, Victor Miranda, John Gholar, Miro Antas. Front row: (L) Phillip Baranek, Justin O’Connor.



(l-r) Konrad Szatkowski, Vlad Illiescu, Greg Maciasz, Jarret Zablocki, Roger Class, Senan Karmo, Hani Badawi, Elven Matty, Dan Simon, Greg Dziewit, Tom Karareka and Addison Foster.

will also be modified for a more reliable cold start performance.”

As in the past, look for innovation from Wayne State. The 1998 team were one of the first to employ air-intake-manifold heating elements to aid in cold start.

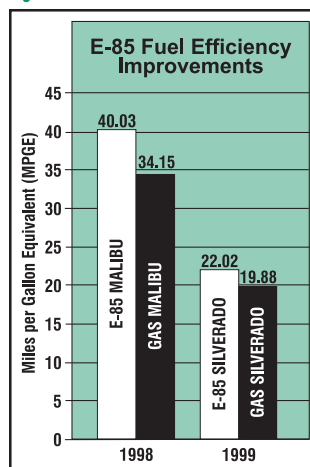
“Having the vehicle for a second year has allowed us more time for testing and exploring different ideas that could prove beneficial to our success,” comments Maciasz. “It hasn’t changed our approach for 2000, though, which is to implement a simple and reliable conversion of the vehicle.”

E-85 Challenges

Fuel economy’s chore — defeat the chemistry

One of the more difficult tasks facing the 16 Chevrolet Silverado teams taking part in the 2000 Ethanol Vehicle Challenge will be achieving top fuel economy from their 4-WD V-8 trucks operating on E-85.

“The reason this is such a



challenge lies in the basic chemistry of the E-85 fuel itself,” comments GM Challenge organizer, Gerald Barnes. “It contains about 25% less energy than gasoline.”

Two popular approaches taken by the U.S. and Canadian university teams capitalize on the fact that ethanol has a much higher octane value than gasoline, thus allowing for increased com-

pression ratios, which coincidentally leads to more power, plus a downsizing of the engine itself.

Other changes include altering overall axle ratios to reduce friction, low friction coatings on engine parts and polished piston heads too.

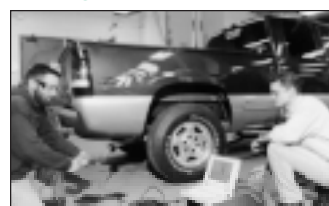
“The best solutions may involve

a combination of some or all of these,” notes Barnes, “combined with extensive engine calibration to optimize spark timing and air-fuel ratios.”

These ideas seem to be working, because in the two previous Ethanol Vehicle Challenges top fuel efficiencies have actually been 10-17% greater than the stock gasoline truck.

Emissions busting battle must first light the fire

Just as the chemistry of “a lot less carbon” conspires to pull-down E-85’s fuel economy, if not effectively addressed, so too



Silverado emissions testing

does lower energy density give rise to another challenge.

The cooler-burning fuel, if left unassisted, heats up engine elements more slowly than necessary to take complete environmental advantage of what otherwise is a clean burning fuel.

This is the situation faced by all E-85 vehicles and by Ethanol Vehicle Challenge participants in particular, who are intent on going much further than “back-to-square-one”.

Many are looking at the possibility of ULEV status, a feat that’s only attainable after guar-

anteeing closed-loop operation by creating a speedy achievement of acceptable oxygen-sensor and radiator-water temperatures. This

brings to bear the PCM’s ability to fine-tune the engine and really curtail engine-out emissions.

The same challenge exists with catalytic convertors, where swiftly attaining light-up temperature is a must, before employing further reduction strategies.

The Ethanol Vehicle Challenge has been very successful in both these areas along with a third — getting the correct open-loop mapping. All together, they offer E-85 vehicles a meaningful new role in assuring a healthy air-quality future.

Cold start a special challenge for low-rvp E-85

Liquids don’t burn, only their gases do, which is why a low Reid vapor pressure fuel like 85% ethanol faces a cold weather starting challenge. Matching consumer’s quick-start expectation is the task facing the 16 teams in the 2000 Ethanol Vehicle Challenge — 15% of the final score.

Previously, most teams had minimal difficulty with start temperatures of 20°F on the compe-

tition fuel, with a low 6.2 rvp to help simulate 0°F starting. This time, it’s an actual 0°F start, on the same fuel.

Innovation will be needed, but Challenge organizers also expect refinements to what’s worked already — fuel line and air intake heaters, thermal storage units, and distillation systems to separate off the higher volatiles for cold start use.

HEADLINE SPONSORS

U.S. Department of Energy • General Motors of Canada • Natural Resources Canada